UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2009*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9-12 and 20-22* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-12 and 20-22* is/are rejected.

7)☒ Claim(s) *22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 December 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   This Office action for U.S. Patent Application 10/765,813 is responsive to communications filed 21 December 2009, in reply to the Non-Final Rejection of 21 September 2009. Claims 9–12 and 20–22 are pending. Of those, Claims 21 and 22 are new.

2.   In the previous Office action, Claims 9–12 and 20 were rejected under 35 U.S.C. 103(a) as obvious over U.S. Patent Application Publication 2002/0080870 A1 (*Piazza*) in view of U.S. Patent 6,542,541 B1 (*Luna*).

Response to Arguments

3.   Applicant's arguments, see pages 5–6, filed 21 December 2009, with respect to the rejection(s) of claim(s) 9 and 20 under 35 U.S.C. 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of U.S. Patent Application Publication 2002/0174305 A1 (Vartti).

Claim Objections

4.   Claim 22 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 22 recites in full,

"the video decoder of claim 9, wherein the extractor transmits the indicator after the decompression engine finishes processing the portion". However, parent Claim 9 already recites "an extractor for transmitting an indicator...after the decompression engine decodes the portions of the video data".

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 9–12 and 20–22 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication 2002/0080870 A1 (*Piazza*) in view of U.S. Patent Application Publication 2002/0174305 A1 (*Vartti*). *Piazza* teaches a video decoder with motion compensation. Regarding Claim 9, Figure 8 illustrates a block diagram of the decoder. Included is memory 830 storing compressed macroblock 880 (paragraph 0065). The compressed macroblock is then loaded into cache memory 810 (paragraph 0066). Cache memory 810 is the claimed "local buffer". Processor 800 then processes the data in cache memory 810 and performs decoding operations such as inverse DCT (paragraph 0067). Then, Processor 800 is the claimed "decompression engine". However, the present invention differs from *Piazza* in that the present invention discloses an extractor for direct memory access engine control of the local

buffer, giving instructions that the compressed data stored in the buffer may be overwritten by more compressed video data[1].

Vartti teaches a system for controlling cache memory. Regarding Claim 9, figure 3 illustrates a flowchart of the memory locking process. At step 300, a processor requests a "storage lock" on a cache line. *Vartti*, paragraph 0049. The lock grants the processor the exclusive access to the cache line so that no other processor or memory unit may access it. *Id.* at 0005. This exclusivity includes a right to exclude other processors or memory units from overwriting the line. *Id.* at 0045, 0037. The ownership may additionally be a read-only type, in which the owner may read the line, but no other requester may access the line at all. *Id.* at 0043. As applied to the present invention, when the decompression engine locks the buffer that stores the "portion", the buffer cannot be overwritten by another component of the decoder.

At step 302 of *Vartti*, the system determines if the requested cache line is owned by another requester or if it is clear for the current requester. *Vartti* at paragraph 0049. If the cache line is clear or if the current requester already owns the line, the request from step 300 is granted at step 306. *Id.* at paragraph 0050. The processor is then free to use the data in the cache subject to the conditions of the ownership, such as read-only. *Id.* at 0051. As applied to the present invention, the processing required during

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[1] It is noted that in the *Piazza* decoder, only compressed macroblocks are stored in cache memory 810. Decompressed, decoded macroblocks are stored in a different buffer: memory buffer 820 (paragraphs 0067–0068). Then, it cannot be said that cache 810 overwrites compressed data with decompressed data, as in the previously-cited MacInnis reference, as discussed in the pre-appeal brief conference. Since Cache memory 810 has finite capacity, it is inherent that some compressed macroblock data stored in it will eventually be overwritten with new compressed macroblock data as the decoder continues to run over time. *Piazza* also implies that cache memory 810 only has the capacity to store one compressed macroblock at a time.

ownership is decompressing the data portion stored in the buffer. After the processor is finished using the data, it issues a "release lock notification" at step 308. *Id.* This release lock notification is the claimed "indicator" allowing further processing of the cache data, such as overwriting. Figure 1 illustrates the computing system of *Vartti* as a whole as a massively parallel or distributed environment, and figure 2 illustrates an example of one processing module. *Id.* at 0024. Included in the processing module is an instruction processor 202 which performs the actual processing operations, cache 206, and storage controller 204 which interfaces between the processor and the cache. *Id.* at 0025. Then, the cache 206 is the claimed "local buffer", processor 202 is the claimed "decompression engine", and controller 204 is the claimed "extractor".

Piazza discloses the claimed invention except for determining when it is "safe" to overwrite a buffer memory. *Vartti* teaches that it was known to "lock" a cache memory to allow one processor to read its contents as needed and no other component of a system to access it during the time the memory is locked. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to modify the cache memory of *Piazza* to be lockable when the processor is decoding the data stored within, as in the cache memory of *Vartti*, since *Vartti* states in paragraph 0004 that such a modification would prevent processing errors from inconsistent or incoherent data that changes during processing.

Regarding Claim 10, in *Piazza*, a macroblock command to data stored in cache memory 810 (paragraph 0087) is the claimed command.

Regarding Claim 11, in *Piazza*, assuming only one macroblock 880 is in cache memory 810 at once, a second macroblock 880 after a first macroblock 880 is processed and stored in memory buffer 820 is the claimed "another portion of the compressed video data".

Regarding Claim 12, as previously mentioned, figure 1 of *Vartti* illustrates a parallel embodiment with multiple caches and processors.

Regarding Independent Claim 20, as discussed above, in *Piazza*, processor 800 is the claimed video decoder and cache 810 is the claimed local buffer. In *Vartti*, interface 204 between the processor and the cache incorporates the claimed extractor and direct memory access engine.

Regarding Claim 21, *Piazza* is expressly described as a system "for motion compensation of digital video data". *Piazza*, abstract.

Regarding Claim 22, as shown in figure 3 of *Vartti*, the processor issues a release lock at step 308 allowing external overwriting of the cache data "upon completion of instruction(s)".

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. N. W./
Examiner, Art Unit 2621

/Mehrdad Dastouri/
Supervisory Patent Examiner, Art Unit 2621